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Freshwater Decapods of Godavari River, Bhadrachalam, Telangana

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Abstract

Freshwater crabs and prawns, classified under Order Decapoda are the least studied fauna of the state Telangana. In the present work, the genus *Caridina* is reported for the first time from the states, Andhra Pradesh and Telangana with two species *Caridina shenoyi* and *C. fernandoi*. Five species of prawns and one species of crab have been studied first time from the River Godavari in Telangana state which were collected from four sampling sites in and around Bhadrachalam town.

Keywords: Bhadrachalam, Brachyuran Crab, Caridean Prawns, Godavari River

Introduction

Decapoda is an order of subphylum Crustacea in Class Malacostraca. About 655 species of Caridean prawns and 1476 species of brachyuran crabs are known in world which inhabits freshwater bodies. Among them, 118 species of prawns (Valarmathi, 2017) and 122 species of crabs (Pati & Thackray, 2018) had been reported in India; a total number of 13 species (prawns 8 species, crabs 5 species) had been found in previous surveys from different lakes of Telangana (Ghosh *et al.,* 2005; Srivastava, 2007; Dev Roy *et al*., 2010; Ghatak *et al.,* 2013; Dev Roy *et al.,* 2015). In this survey, four locations had been selected for sampling along the bank of river Godavari beside the town Bhadrachalam, five species of prawns, three species under genus *Macrobrachium* and two species of *Caridina*, and one species of crab belonging to the genus *Barytelphusa* has been identified from the collected samples. The present study reports occurrence of these species from Godavari River near Bhadrachalam, Telangana.

Material and Methods

Decapods were collected from banks of rivers, under small rocks, half immersed vegetation etc. and preserved in separate jars with 10% buffered formalin or 70-80% Ethyl alcohol (Ng, 2017). Four locations had been selected for sampling along the bank of river Godavari and given in Table 1 and Figure 1. Crabs were handpicked from the muddy and rocky habitats, beneath the stones/ rocks, and also by digging the mud and Prawns were collected by using D-shaped hand net and fishing net. The identification of the specimens on the basis of their morphological characteristics was made with the help of standard literature (Alcock, 1909; Jalihal *et al.,* 1984, 1988). All the specimens were collected by Sudipta Mandal and the identified specimens were deposited in the National Zoological Collections of Freshwater Biological Research Center (FBRC), Zoological Survey of India, Hyderabad.

Table 1. List of collection sites and collection date

Sl. No.	Locality Name	Collection Date	Latitude	Longitude
1.	Intakewell ITC, Iravandi	06-ii-2018	17.743°N	80.879°E
2.	Bathing ghat, Bhadrachalam	08-ii-2018	17.655°N	80.877°E
3.	KTPS intakewell, Burgampahad	07-ii-2018	17.640°N	80.884°E
4.	Kinnersani confluence, Burgampahad	07-ii-2018	17.645°N	80.896°E

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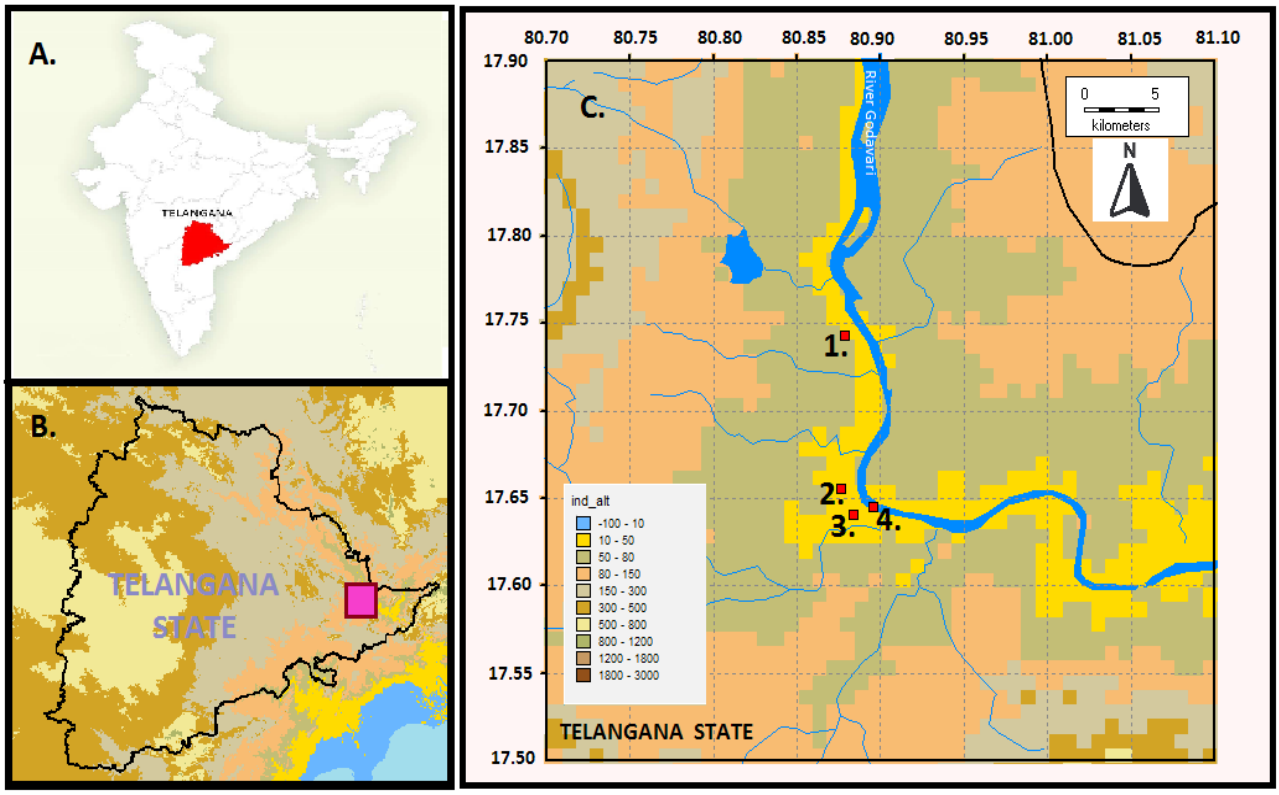

Figure 1. **A.** Location map of Tenangana State in India; **B.** Survey locality in Telangana State; **C.** Area Surveyed: 1. Intakewell ITC, Iravandi, 2. Bathing ghat, Bhadrachalam, 3. KTPS intakewell, Burgampahad, 4. Kinnersani confluence, Burgampahad.

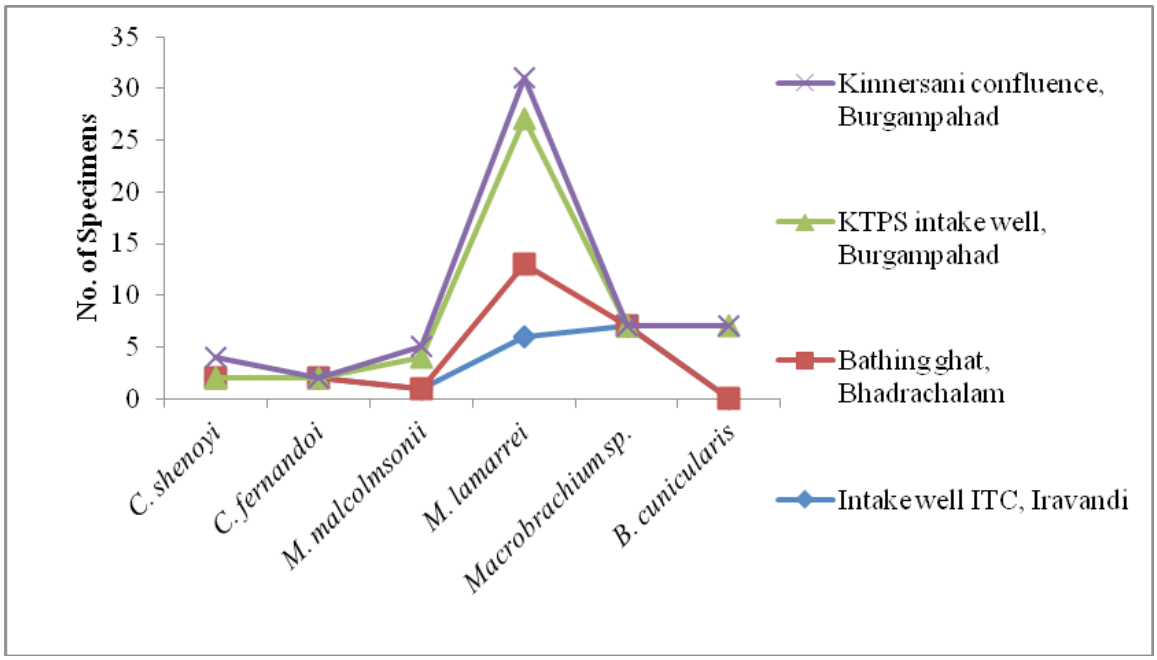

Figure 2. Line chart of species distribution in each sampling location.

Results

Survey has been done in four sampling sites and a total of 56 specimens have been collected which contains five species of prawns and one species of crab. Distribution of collected specimens from each sampling location is grafted in the line chart (Figure 2).

Systemic Account

1. *Caridina shenoyi* Jalihal & Sankolli, 1984 (Figure 3B).

1984. *Caridina shenoyi:* Jalihal *et al.*, *Rec. zool. Surv. India. Occ. Paper No*. **69:** 21.

2013. *Caridina shenoyi:* Valarmathi & Raghunathan, *zool. Surv. India. State Fauna Series,* **21:** 67.

Material examined: FBRC/ZSI/INV/1780, 2 ex., Godavari River, KTPS intake well, Burgampahad, Bhadradri Kothagudem dist.; FBRC/ZSI/INV/1781, 2 ex., Kinnersani confluence, Burgampahad, Bhadradri Kothagudem dist.

Diagnosis: Rostrum formula $\frac{18 - 22\,(6 - 7)}{6 - 7}$, rostrum reaches up to the end of 2nd segment of antennal peduncle but does not reach up to the end of the antennal scale; 1st cheliped stout, palm sub equal to finger, a tuft of hair with chela, Carpus with deep anterior excavation; 2nd cheliped also stout, more or less equal to 1st cheliped, a tuft of hair with chela; 5th periopod without small spinules in ischium; abdomen smooth without any abdominal hump, berried females carries around 350 to 470 eggs measuring 0.6×0.4 mm.; endopod of 1st pleopod of male acutely triangular, appendix masculine 0.3 times as long as endopod; 6 pairs of movable spines, posterior margin 'V' shaped posses 6 spines; suture in exopod of uropods across the middle with 18-22 movable spines.

Distribution: India- Kerala, Karnataka, Telangana.

2. *Caridina fernandoi* Arudpragasam & Costa, 1962 (Figure 3A).

1984. *Caridina kempi:* Jalihal & Sankolli, *Rec. zool. Surv. India. Occ. Paper No*. **69:** 13.

2019. *Caridina fernandoi:* Werner *et al., Zoologischer Anzeiger*: 16.

Material examined: FBRC/ZSI/INV/1778, 2 ex., Godavari River, intake well ITC, Iravandi, Khammam dist.

Diagnosis: Rostrum formula $\frac{17 - 21\,(3 - 6)}{4}$, rostrum reaches up to the end of 2nd segment of antennal peduncle but not reaches up to the end of the antennal scale; 1st cheliped stout, palm sub equal to finger, a tuft of hair with chela, carpus with deep anterior excavation; 2nd cheliped also stout, more or less equal to 1st cheliped, a tuft of hair with chela; Isocheim of its 5th pereopod bears a small spine; abdomen smooth without any abdominal hump, berried females carries around 300 to 370 eggs measuring 0.6×0.4 mm; endopod of 1st pleopod of male obtusely triangular, appendix masculine 0.3 times as long as endopod; 6 pairs of movable spines, terminal pair flanking the posterior-lateral angles of telson, posterior margin 'V' shaped posses 7 long plumose setae; Uropods exceeding tip of the telson, suture in exopod across the middle with 15-21 movable spines.

Distribution: India- Kerala, Karnataka, Telangana. *Elsewhere*: Sri Lanka.

3. *Macrobrachium malcolmsonii* (H. M. Edwards, 1844) (Figure 3C)

1844. *Palaemon malcolmsonii:* H. Milne Edwards, In: *Jacquemont Voyage, Inde,* **4**(2): 8.

2015. *Macrobrachium malcolmsonii:* Dev Roy *et al.*, In: *Wetland Ecosystem Series,* **18**: 63-68.

Material examined: FBRC/ZSI/INV/1718, 3 ex., Godavari River, KTPS intake well, Burgampahad, Bhadradri Kothagudem dist.; FBRC/ZSI/INV/1719, 1 ex., Kinnersani confluence, Burgampahad, Bhadradri Kothagudem dist.; FBRC/ZSI/INV/1723, 1 ex., Godavari River, intake well ITC, Iravandi, Khammam dist.

Diagnosis: Rostral formula $\frac{9 - 11(2 - 4)}{5 - 6}$, more or less equal to antennal scale but longer than antenular peduncle; antennal spine and hepatic spine present; 1st cheliped very short, equal and slender; 2nd cheliped strong, equal and well developed, movable finger covers with dense velvety pubescence in adult, fingers are longer than half of the palm, palm not swollen; 3rd to 5th periopod in structure with simple dactylus; abdomen smooth; telson with 2 pairs of dorsal movable spines and 2 pairs of posterior spines with 12-14 plumose setae, posterior apex exceed the tips of longer posteriolateral spines; uropods exceeding tip of telson, mobile mesial spine of exopod is absent.

Distribution: India- Andhra Pradesh, Bihar, Gujarat, Madhya Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, Tripura, Telangana. *Elsewhere*: Pakistan.

4. *Macrobrachium lamarrei* (H. Milne Edwards, 1837) (Figure 3D)

1837. *Palaemon lamarrei:* H. Milne Edwards, *Hist. Nat. Crustacea*, **2**: 397.
2013. *Macrobrachium lamarrei:* Valarmathi & Raghunathan, *State Fauna Series,* **21**: 69.

Material examined: FBRC/ZSI/INV/1722, 6 ex., Godavari River, intake well ITC, Iravandi, Khammam dist.; FBRC/ZSI/INV/1725, 14 ex., Godavari River, KTPS intake well, Burgampahad, Bhadradri Kothagudem dist.; FBRC/ZSI/INV/1726, 7 ex., Godavari River, Bathing ghat, Bhadrachalam, Bhadradri Kothagudem dist.; FBRC/ZSI/INV/1727, 4 ex., Kinnerasani confluence, Burgampahad, Bhadradri Kothagudem dist.

Diagnosis: Rostral formula $\frac{7-10\,(2-3)}{7-8}$; dorsally 1-2 sub distal teeth present with a distinct gap, rest are evenly placed, longer than both 3rd segment of peduncle and the antennal scale; antennal spine and hepatic spine present; 1st chelipeds slender, equal and extending the tip of the antennal scale by chela; 2nd chelipeds equal, slender, chela longer than half but shorter than 3/4th of carpus, palm longer than fingers and with equal thickness; 3rd to 5th periopods similar in structure with simple dactylus; abdomen smooth; endopod of the 2nd pleopod elongated with a pointed end, appendix masculine as long as endopod and 2.3 times longer than appendix interna; posterior margin of telson with 'T' shaped pointed median end, 1-2 pairs of setae; uropods exceeding tips of telson, mobile mesial spine of exopod is absent.

Distribution: India- Bihar, Karnataka, Maharashtra, Manipur, Odisha, Rajasthan, Tamil Nadu, West Bengal, Telangana.

5. *Macrobrachium* sp. (Figure 3E)

Material examined: FBRC/ZSI/INV/1779, 7 ex., Godavari River, KTPS intake well, Burgampahad, Bhadradri Kothagudem dist.

Diagnosis: Rostral formula $\frac{10-11\,(3-4)}{2-3}$, rostrum straight, all teeth placed evenly in dorsal side, rostrum reaches up to the end of the 3rd segment of peduncle and extends beyond the half of the antennal scale; antennal and hepatic spine present, carapace rough in the anterior portion, smooth in the posterior portion; 1st cheliped long slender; 2nd cheliped larger than 1st cheliped, palm longer than fingers, not densely pubescence, with longitudinal groove; 3rd to 5th periopods similar in structure with simple dactylus; abdomen smooth; telson with 2 pairs of dorsal movable spines and 2 pairs of posterior spines with 14-18 plumose setae, posterior apex not reaching about to level of tips of longer posteriolateral spines; Uropods are exceeding tip of telson, mobile mesial spine of exopod of uropod is large and as large as the distolateral tooth.

Remarks: These specimens from the Godavari River are here referred to *Macrobrachium* sp., and it has a few resemblances with the congeners *Macrobrachium andamanicum* and *Macrobrachium aemulum* (Nobili 1906) (Tiwari, 1952). Further investigation is in progress.

6. *Barytelphusa cunicularis* (Westwood in Sykes, 1836) (Figure 3F)

1836. *Thelphusa cunicularis:* Westwood in Sykes & Westwood, *Trans. Linn. Soc. London*, **1**: 183.
2014. *Barytelphusa cunicularis:* Pati, S.K. & Sharma, R.M., *zool. Surv. India*, *Occ. Paper No.,* **363**: 6.

Material examined: FBRC/ZSI/INV/1717, 7 ex., Godavari River, KTPS intake well, Burgampahad, Bhadradri kothagudem dist., Coll. Sudipta Mandal.

Diagnosis: Carapace broader than long, cervical groove distinct, meets with postorbital crest; frontal median triangle incomplete, epistome bilobed, without median tooth; post orbital and epigastric cristae fused, the latter slightly anterior to former; epibranchial tooth broad, blunt, separated from external orbital angle with visible cleft; suture between thoracic sternites 2-3 distinct and suture between thoracic sternites 3-4 slightly visible as grooves; male abdomen narrowly triangular, 6th segment broader than long with concave lateral margin, telson is tongue-shaped, abdominal cavity deep; G1 long, narrow, curving slightly outwards, terminal segment long with pointed tip, G2 short, distal segment short; female pleon broadly tongue-shaped, vulvae oval-shaped, situated just beside the margin of thoracic sternite 5.

Distribution: India-Maharashtra, Kerala, Karnataka, Tamil Nadu, West Bengal, Telangana.

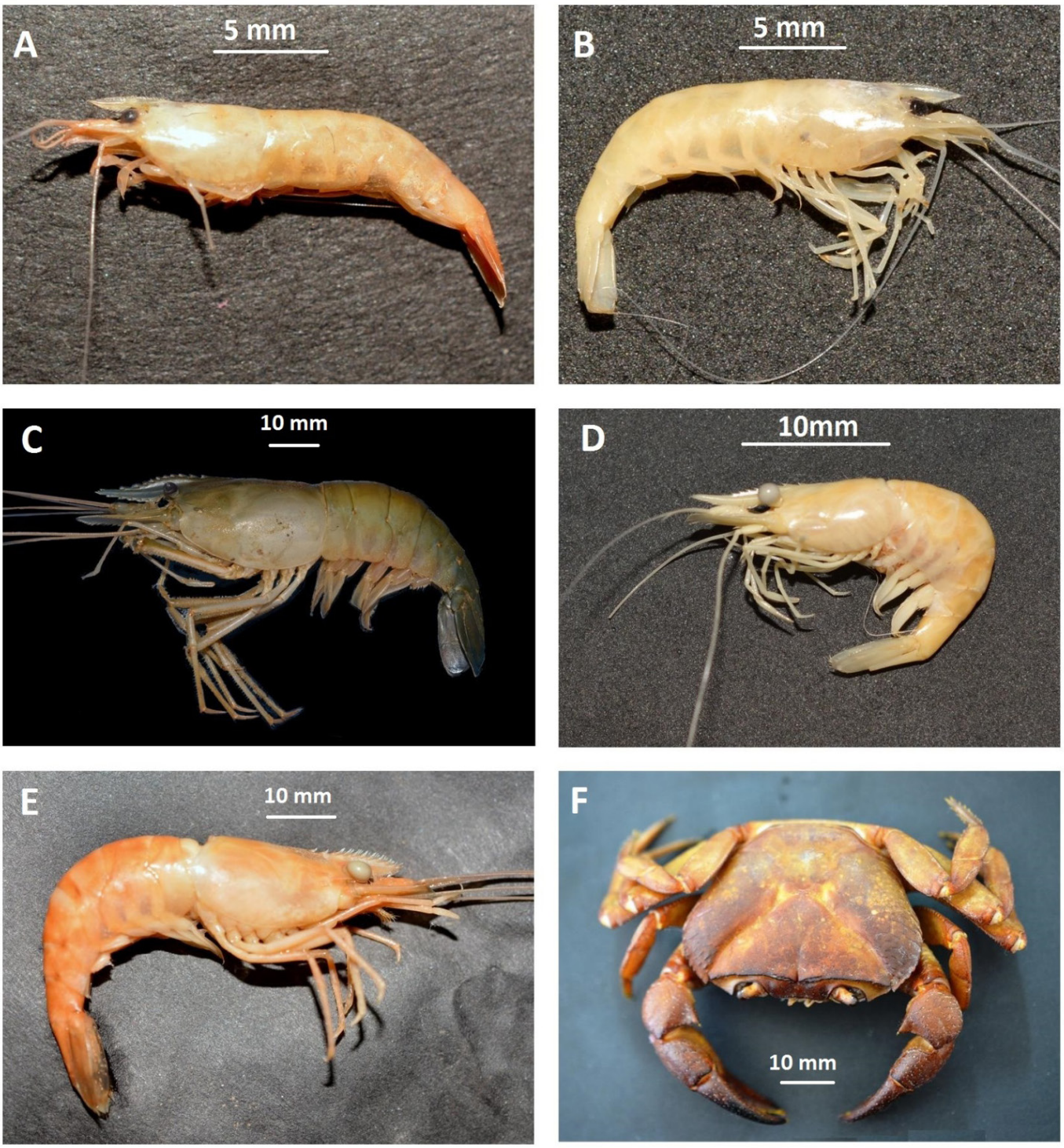

Figure 3. A. *Caridina fernandoi* Arudpragasam & Costa, 1962; **B.** *Caridina shenoyi* Jalihal & Sankolli 1984; **C.** *Macrobrachium malcolmosonii malcolmsonii* (H. M. Edwards, 1844); **D.** *Macrobrachium lamarrei lamarrei* (H. M. Edwards, 1837); **E.** *Macrobrachium* sp.; **F.** *Barytelphusa cunicularis* (Westwood in Sykes, 1836).

Discussion

Very few works on Decapoda has been documented (Ghosh *et al*., 2005; Srivastava, 2007; Ghatak *et al*., 2010; Gatak *et al*., 2013; Dev Roy, 2015) before the current report and only the reported genus of Infraorder Caridea was *Macrobrachium* from the state Telangana as well as Andhra Pradesh prior to bifurcation. The genus *Caridina,* belongs to Infraorder Caridea, is going to be reported for the first time from these states with the two species *Caridina shenoyi* and *C. fernandoi*. *Macrobrachium malcolmsonii* and *M. lamarrei* are very common freshwater prawns available in this area and more or less they are collected from all the sampling sites. *Caridina shenoyi* is collected from both of the places Intake well ITC, Iravandi and Kinnersani confluence, Burgampahad; on the other hand *C. fernandoi* was only available in Intake well ITC, Iravandi. *Macrobrachium* sp. is comparatively new in this region as it has barely any closeness with its congeners like, *M. andamanicum* and *M. aemulum*. Though *Barytelphusa cunicularis* is a very common species and mostly available in the bank of rivers and lakes, surprisingly it is reported from only one location, KTPS intake well, Burgampahad. Ecologically the availability and species diversity in these four sites are very important as Bhadrachalam is a Hindu pilgrimage site with the Rama-Mandir and there is a factory of paperboard by ITC on the other bank of the river. From the first location, Intake well ITC, Iravandi 5 species of prawns are reported which place is free from all type of pollutions and human interferences. The 2nd location is the Bathing ghat of the Bhadrachalam temple where least diversity of specimen (only the common prawn species, *M. lamarrei lamarrei*) is reported as for excess human activity and pollution. From the 3rd location, KTPS intake well, Burgampahad we got the crab, *B. cunicularis* which is very abundant there along with the two common prawn species (*M. malcolmsonii* and *M. lamarrei*). This location witnesses the effluents from paperboard Company into the river body. Remarkably, the Kinnersani confluence, Burgampahad (where the river Kinnersani meets with the river Godavari) has more prawn diversity compared to the second and third location probably for the distance from human activity and pollution.

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